

Appl. No. 10/657,132
Amendment dated: March 1, 2006
Reply to OA of: November 1, 2005

REMARKS

This is in response to the Official Action of November 1, 2005. Applicants have amended the claims in order to more precisely define the scope of the present invention, taking into consideration the outstanding Official Action. Specifically, Applicants have amended claim 1 to recite that a plurality of heat transmission pins are disposed in one part of the through holes of the heat enhanced semiconductor package and air convection is provided via the other part of the through holes. Support for this amendment may be found, for example, at page 7, lines 4-8 of the specification as originally filed. In light of this amendment, Applicants have canceled claim 3. Accordingly, claims 4, 8, 12, 13 and 15 have been amended to depend from claim 1. Finally, Applicants have amended claim 12 to recite that the heat transmission adhesive is formed between the back surface of the semiconductor chip and a surface of the universal heat spreader. This feature is clearly illustrated in, for example, Figure 4. Accordingly, Applicants respectfully submit that all of the claims now pending in the application are in full compliance with the requirement of 35 U.S.C. §112 and are allowable over the references of record.

The Official Action urges that claims 2 and 18-23 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a non-elected species. Accordingly, Applicants have canceled claims 2 and 18-23 without prejudice or disclaimer. Applicants reserve the right to file a divisional application on the non-elected invention at a later time.

The Official Action urges that claim 12 is rejected under 35 U.S.C. §112, second paragraph as being indefinite. Specifically, the Official Action notes that while Figure 4 illustrates the heat transmission adhesive formed between a surface of the spreader and the back surface of the chip, claim 12 recites heat transmission adhesive formed between the back surface of the semiconductor chip and the upper surface of the carrier. Accordingly, Applicants have amended claim 12 as discussed above, i.e., to

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replace the phrase "the upper surface of the carrier" with the phrase "a surface of the universal heat spreader". Applicants respectfully submit that claim 12 is now consistent with the heat enhance semiconductor package illustrate in Figure 4 and therefore respectfully request that the §112, second paragraph rejection of claim 12 be withdrawn.

The rejection of claims 1, 12-14, 16 and 17 under 35 U.S.C. §102(e) as being anticipated by Tao (US Pat. No. 6,410,981) has been carefully considered but is most respectfully traversed in light of the amendments to the claims and the following comments.

Applicants wish to direct the Examiner's attention to MPEP § 2131 which states that to anticipate a claim, the reference must teach every element of the claim.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed.Cir. 1990).

The Official Action urges that Tao discloses every element of claims 1, 12-14, 16 and 17. However, the Official Action implicitly acknowledges that Tao fails to disclose a thermal enhance semiconductor package as claimed in the present invention wherein a heat transmission pin is disposed in one of the through holes (i.e., claim 3 is not grouped in the §102(e) rejection over Tao). As discussed above, Applicants have amended claim 1 to recite that the thermal enhance semiconductor package further comprises a plurality of heat transmission pins disposed in one part of the through holes. Therefore, because Tao clearly fails to disclose each and every element of the presently claimed invention, Applicants respectfully assert that a proper §102(e)

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rejection according to the guidelines set forth in MPEP §2131 has not been established. It is therefore requested that this rejection be withdrawn.

The rejection of claims 1, 3, 12, 15 and 16 under 35 U.S.C. §102(e) as being anticipated by Ro et al. (US Pat. No. 6,608,380) has been carefully considered but is most respectfully traversed in light of the amendments to the claims and the following comments.

Attention is again directed to the portion of MPEP §2131 reproduced above. The Official Action urges that Ro discloses all of the elements of the invention disclosed in claims 1, 3, 12, 15 and 16, including a pin 242 in one hole 244. Applicants specifically traverse this statement in view of the amendment to the claims and the following comments.

As discussed above, claim 1 has been amended to incorporate the limitation of claim 3. Specifically, claim 3 now recites that a plurality of heat transmission pins are disposed in one part of the through holes and air convection is provided via the other part of the through holes. That is to say, the heat enhance semiconductor package of the present invention comprises multiple through holes, some of which have a heat transmission pin disposed therein and others which are not filled with a heat transmission pin to allow for air convection. This configuration is advantageous in that increased heat dissipation is experienced through the use of heat transmission pins, while still allowing heat to escape the heat enhance semiconductor package via air convection.

To the contrary, Ro discloses inserting a screw 242 into the venting holes to create a hermetically sealed cavity 248 (see, e.g., col. 3, lines 62-65). Ro discloses using a rubber packing 242b on the space between the screw and the venting hole to better achieve the hermetic seal. Ro further discloses that this method is advantageous over using a sealant because voids in a sealant that would destroy the seal are thereby prevented (see, e.g., col. 2, lines 15-17). In light of this disclosure, it is clear that the pins disclosed in Ro are designed to create a hermetic seal, and therefore it naturally

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follows that all of the venting holes 244 need to be filled with screws 242 in order to create the hermetic seal. Clearly, a hermetic seal would not be created if only a portion of the venting holes were plugged with the screws 242. Therefore, it is clear that Ro fails to disclose heat transmission pins disposed in one part of the through holes and air convection is provided via the other part of the through holes as claimed in the present invention, since such a configuration would frustrate the objective of the invention (i.e., creating a better hermetic seal). In light of this, Applicants respectfully submit that Ro fails to establish a §102(e) rejection according to the guidelines set forth in MPEP §2131, and therefore this rejection should be withdrawn.

The rejection of claims 3, 8 and 15 under 35 U.S.C. §103(a) as being unpatentable over Tao in combination with Cromwell (US Pat. No. 6,084,178) has been carefully considered, but is most respectfully traversed in light of the amendments to the claims and the following comments.

Applicants wish to direct the Examiner's attention to the basic requirements of a prima facie case of obviousness as set forth in the MPEP § 2143. This section states that to establish a prima facie case of obviousness, three basic criteria first must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Section 2143.03 states that all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an

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independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Applicants also note MPEP §2143.01, which states in part that, if a proposed modification would render the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Applicants also most respectfully direct the Examiner's attention to MPEP § 2144.08 (page 2100-114) wherein it is stated that Office personnel should consider all rebuttal argument and evidence presented by applicant and the citation of In re Soni for error in not considering evidence presented in the specification.

The Official Action urges that Cromwell discloses pins 17 in holes. Further, the Official Action urges that it would have been obvious to one of ordinary skill in the art to further incorporate holes in the lid and ring of Tao in order to further secure the lid to the ring as taught by Cromwell. Applicants specifically traverse this statement.

First, Applicants respectfully request clarification with respect to the motivation statement provided in the Official Action. The motivation statement urges that it "would have been obvious... to incorporate holes in the lid and ring of Ta [sic] in order to further secure the lid to the ring as taught by Cromwell" (emphasis added). Does this imply that the Official Action is relying upon Cromwell to teach through holes in the universal heat spreader as claimed in the present invention? Such a statement would seem redundant as the Official Action has already declared that Tao discloses through holes 10 (see Figure 7 of Tao). Therefore, Applicants assume for purpose of this response that the Official Action meant to rely on Cromwell as disclosing pins and the motivation statement was provided to illustrate why it would have been obvious to incorporate the pins/screws of Cromwell in the device of Tao. If this interpretation is incorrect, Applicants respectfully request clarification in the next Official Action.

Assuming that Cromwell is relied upon for its teaching of pins, Applicants respectfully assert that such a teaching cannot be combined with Tao because such

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modification to Tao would render the invention unsatisfactory for its intended purpose. See *In re Gordon* above. Tao clearly states that vent 10 illustrated in Figure 7 is for allowing moisture to discharge out of the device disclosed in Tao. Therefore, plugging the vents 10 with the pins disclosed in Cromwell as proposed in the Official Action would clearly render the Tao invention unsatisfactory for its intended purpose, since moisture would not be able to escape out of the blocked vents 10. Therefore, the §103(a) rejection set forth in the Official Action fails to provide a proper motivation statement according to the guidelines set forth in MPEP §2143. In light of this, Applicants respectfully submit that a prima facie case of obviousness has not been established and therefore request that this rejection be withdrawn.

Additionally, Applicants note the discussion above with respect to the rejection of claims 1 and 3 over Ro. Tao and Cromwell, either standing alone or in combination, fail to disclose a heat enhance semiconductor package wherein heat transmission pins are disposed in one part of the through holes and air convection is provided via the other part of the through holes. Tao fails to disclose pins altogether, and Cromwell discloses pins inserted in every hole to secure the heat sink 1 to the docking assembly 13. For all of these reasons, the §103(a) rejection over Tao in view of Cromwell should be withdrawn.

The rejection of claims 4-7 and 9-11 under 35 U.S.C. §103(a) as being unpatentable over Tao in view of Cromwell and Ootsuki et al. (US Pat. No. 5,652,461) has been carefully considered but is most respectfully traversed in light of the amendments to the claims and the following comments.

Attention is again directed to the portion of MPEP §2143 reproduced above. The Official Action urges that while Tao and Cromwell fail to disclose forming a universal heat spreader from copper, aluminum, silver or a combination, Ootsuki discloses a thermal conductor of copper, aluminum or silver. Further, the Official Action urges that it would have been obvious to modify Tao and Cromwell with the teaching of Ootsuki to provide high thermal conductivity. Applicants specifically traverse these statements.

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First, Applicants note that the rejection of claims 4-7 and 9-11 over Tao in view of Cromwell and Ootsuki depends on the rejection of claims 3 and 8 over Tao in view of Cromwell as set forth earlier in the Official Action. However, for all the reasons discussed above with respect to that rejection, Applicants respectfully submit that this rejection is improper. Briefly, Tao and Cromwell fail to disclose heat transmission pins disposed in some of the through holes of the universal heat spreader and no transmission pins in other through holes of the universal heat spreader to allow for air convection. Accordingly, any rejection that depends on this combination of references as its foundation is deficient for the same reason set forth above.

Applicants would also like to point out that the Official Action has not considered all of the claim limitations set forth in claims 4-7 and 9-11. Specifically, Applicants note that claims 7 and 11 recite that the inner walls of the through holes are coated with a copper layer. The Official Action only addresses the use of copper, silver or aluminum in forming the spreader, and wholly ignores the limitations set forth in claims 7 and 11. Furthermore, regardless of the statement in the Official Action that selection of a known material based on its suitability for its intended use supports a prima facie obviousness determination, this does not detract from the fact that the Official Action has failed to show where in the references coating the inner walls of the through holes with any material is disclosed. Absent such a showing, no statement of obviousness based on selection of a material suitable for its intended purpose can support a proper §103(a) rejection. Accordingly, Applicants respectfully traverse these rejections and request that they be withdrawn.

The rejection of claims 4-11 under 35 U.S.C. §103(a) as being unpatentable over Ro in combination with Ootsuki has been carefully considered but is most respectfully traversed in light of the amendments to the claims and the following comments.

Attention is again directed to the portion of MPEP §2143 reproduced above. Applicants note that the rejection of claims 4-11 over Ro in view of Ootsuki depends on the rejection of claims 1, 3, 12, 15 and 16 over Ro set forth earlier in the Official Action.

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However, for all the reasons discussed above with respect to that rejection, Applicants respectfully submit that this rejection is improper. Briefly, Ro fails to disclose heat transmission pins disposed in some of the through holes of the universal heat spreader and no transmission pins in other through holes of the universal heat spreader to allow for air convection. Accordingly, any rejection that depends on this combination of references as its foundation is deficient for the same reason set forth above.

Applicants would also like to point out that the Official Action has not considered all of the claim limitations set forth in claims 4-11. Specifically, Applicants note that claims 7 and 11 recite that the inner walls of the through holes are coated with a copper layer. The Official Action only addresses the use of copper, silver or aluminum in forming the spreader, and wholly ignores the limitations set forth in claims 7 and 11. Furthermore, regardless of the statement in the Official Action that selection of a known material based on its suitability for its intended use supports a prima facie obviousness determination, this does not detract from the fact that the Official Action has failed to show where in the references coating the inner walls of the through holes with any material is disclosed. Absent such a showing, no statement of obviousness based on selection of a material suitable for its intended purpose can support a proper §103(a) rejection. Accordingly, Applicants respectfully traverse these rejections and request that they be withdrawn.

Applicants note that while some of the claim rejections of dependent claims 3-17 have not been specifically addressed in this response, Applicants traverse each and every rejection of the claims for the reasons set forth with respect to any rejection of independent claim 1. That is to say, as claims depending either directly or indirectly on independent claim 1, claims 3-17 are allowable over the prior art references for all of the reasons set forth with respect to claim 1 as amended.

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In view of the above comments and further amendments to the claims, favorable reconsideration and allowance of all of the claims now present in the application are most respectfully requested.

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